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Reference:

Steinbacher, G., 1938. "Zur Ethologie unserer einheimischen Mövenarten". *Ber. des Vereins Schlesischer Ornithologen*, Heft 3/4, pp. 42-46.

The nesting, eggs and young of the Saddle-bill Stork, *Ephippiorhynchus senegalensis* (Shaw)

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Although the Saddle-bill is widely distributed through much of Africa south of the Sahara, twenty years ago little had been recorded, and little was known, about the eggs.

Such information as was then available appears to have been based to a great extent on three eggs at the British Museum (Natural History), two of which from the Gould collection (made in South Africa) are unmistakable eggs of the Secretary Bird, *Sagittarius serpentarius* (Miller) measuring 78.4 x 57.4 mm. and 77.0 x 56.4 mm., are end blown and damaged; the other purchased from Taylor is of a Saddle-bill and a much damaged specimen, dimensions approximately 76 x 58.3 mm.

Schönwetter (1960) referring to these eggs at the British Museum (Natural History) comments that they have more the appearance of the eggs of *serpentarius* which they resemble in outline and that they are more tapering than those of other storks.

The British Museum eggs are referred to by Stark and Sclater (1906), Bannerman (1930), Priest (1933) and Austin Roberts (1940), but there is no reference to them in Jackson (1938). Chapin (1932) quotes Heuglin (1873), who found the Saddle-bill breeding on the Upper Nile in January and February, on acacias in the midst of swamps—the eggs dull white and of coarse texture, measuring 76–80.5 x 56–57.5 mm.: Nehrkorn's (1910) bare reference to the egg of this stork "80.5 x 57.5 mm. Central Africa" is presumably based on Heuglin's eggs.

Priest (1948), referring to Southern Africa "Breeds in June and July" and the nest "is built in very tall trees, alongside the big rivers . . . a large structure is firmly built on to stout boughs" which is not particularly explicit. The eggs are "Dull white, coarse in texture and slightly glossed", and measuring "77 x 57 mm.; 76–80.5 x 57.5 mm." (the latter presumably are Heuglin's measurements). Mackworth-Praed and Grant (1952) refer to "A large stick nest in trees", coupled with the inaccuracy "Egg one". The egg measurements "about 78 x 57 mm." and the description "dull white, covered with minute pores" are similar to what Priest (1933) records "according to Sclater". Further, Praed and Grant record breeding White Nile in November, January and February (the last two presumably

attributable to Heuglin, and the first from myself); Northern Abyssinia, November; Uganda, June (my own record); and Nyasaland, probably August. Bouet's (1955) reference to a dirty white egg, slightly glossed and covered with minute pores and measuring 77 x 57 mm., seems to have been copied from Bannerman (1930), Austin Roberts (1940) and others. Up till 1952 the published data appear to have been confined to the somewhat ancient material of Heuglin and of the British Museum (Natural History).

The records which follow—the great majority hitherto unpublished—are arranged according to territory. None of value appears to be available from the Congo.

WEST AFRICA. According to Bouet (1955), in January 1916, near Boghé, in Senegal, on the Senegal river, a pair of Saddle-bills were seen carrying materials to a nest which had been built on an enormous Silk-Cotton Tree, *Eridendron anfractuosum*. This is the only breeding record so far available from a vast region.

SUDAN. In the localities of the Southern Sudan where this stork is fairly common and trees are relatively scarce the nest is easier to find than in the well-treed regions of Eastern, South Central and South Africa, where this bird is widely distributed and may be locally common. During the war years 1941–1945 when Sudan Government officials were perforce taking their leave in the East African territories, the writer was able to contact reliable field naturalists who were prepared, if possible, to assist in obtaining some Saddle-bill eggs. The result was rewarding:— c/2 (one broken) collected on 3rd November 1943 were in an advanced state of incubation and would probably have been laid in early October—the surviving egg measured 84.5 x 62.0 mm.; c/3 collected on 14th September 1944, one of which was broken, measure 80.3 x 57.3 and 82.8 x 58.3 mm.; and c/3, incubation advanced, obtained in April 1945, measurements 80.3 x 55.3, 79.0 x 57.2 and 81.0 x 56.2 mm. The indications are that in the Southern Sudan the breeding season may extend from September till April.

UGANDA. The breeding season in adjacent northern Uganda is not so prolonged and according to various correspondents and from my own records (two juveniles on 1st March able to fly), seems to extend from November (or October) to February (or March). Observations from this region, both east and west of the Nile, all refer to juveniles, out of the nest (from eggs which would have been laid in November, December or early January); these juveniles would be strong on the wing before the rains set in during April. A nest, not far from the Murchison Falls, which is occupied year after year, is a colossal pile of sticks on the flat crown of a tall tree.

In the Lake Edward and Lake George region of western Uganda, where the climatic conditions are different from those in the north, the Saddle-bill nests during May–June. On the east side of the Kazinga Channel, which connects these two lakes, and about halfway between the causeway across the Channel and Lake Edward, a Saddle-bill's nest was found, in the latter part of May, at the top of a 25-foot high *Euphorbia dawei*—a



Nest of Saddle-bill Stork in Uganda on *Euphorbia dawei*.

single, straight stem crowned with a rounded head of angular branches which could be overlooked from the high bank and from which the sitting bird was photographed. Unfortunately, although the eggs were on the point of hatching, the bird deserted and the abandoned eggs were collected on 11th June, they measured 83.3×56.2 , 84.2×58.0 and 86.3×59.0 mm. and were successfully cleaned by the finder who neatly cut out—how I do not know—a circular piece of shell some 15 mm. in diameter (which was eventually replaced), thus enabling the chick to be removed. From south western, southern and eastern Uganda, and from Uganda's Lake Victoria region I have no reliable information about the breeding season.

KENYA. J. G. Williams (1963) calls this stork rare in Kenya, "except at Amboseli National Reserve where several pairs breed." He has never seen a nest there but suggests that the breeding season may be in May and June. A nestling has been obtained from the general region of Amboseli in early July.

TANGANYIKA (now TANZANIA). In the Western Serengeti region Myles Turner (*in litt.*) on 27th June 1962 found a Saddle-bill nest high up (about 60 feet) on top of a 'yellow' acacia thorn tree, *Acacia xanthophloea* on the Upper Seronera river. The large construction of coarse twigs and sticks was very similar to a vulture nest. It contained three large nestlings which were stretching and testing their wings. To do this they would stand up facing into the wind and jump up to about two feet in the air flapping, with wings outstretched. According to Bannerman (1957) the nestlings of the White Stork, *Ciconia c. ciconia* (Linn.) commence to exercise their wings when three weeks old and continue doing so until they start to fly when 58 to 67 days old, so in the case of the

Saddle-bill nestling wing-flapping is unlikely to be an indication of a specific age.

Most of the time one parent was usually on the nest, which appeared large and deep enough to conceal the four birds when they settled down. Two days later one of the juveniles had left the nest—whether it fell or successfully took off is not known—and was found fit and well by the river a mile away. It was observed to be feeding on its own along the Seronera pools.

In late June 1963, Turner saw a pair of Saddle-bills with two fledglings at a small lake eighteen miles south-west of Seronera and in early July he found the remains of one of these juveniles by this lake. As he had noticed that at this stage of their development the young birds appeared to be able to fly only about 60 yards without alighting he is therefore of the opinion that this mortality was probably due to the young bird being chased and caught by a predator. He also mentions that Saddle-bill juveniles, when unaccompanied by their parents, can at a cursory glance easily be mistaken for young Marabou Storks.

NYASALAND (now MALAWI). In July 1945, a reliable village headman, in the north of the Mzimba district, showed W. S. Gray (a Veterinary Officer) a huge stick nest—said to have been lined with grass—which contained eggs about January, some 45 feet up in a *Copaifera mopane* and 75 yards distant from a stream. This nest had been built and occupied by a pair of Saddle-bills in 1944, probably in January; and after nesting early in 1945 the birds in December returned to the nest which they seemed to be repairing, but they soon left not to re-appear (communicated by Benson). Long (1960) records that in the Port Herald district on 5th January 1953 he watched a Saddle-bill gathering sticks and mud from the sudd and flying with them into Portuguese territory.

NORTHERN RHODESIA (now ZAMBIA). Brelsford (1942) recorded the Saddle-bill as common all the year along the Chambeshi River, in Northern Rhodesia and according to native information breeding in August and September, usually having two young—an interesting observation, if accurate, on possible average survival rate. Symmes and Bromley (1953), referring to the same territory, record that on 1st and 2nd June 1952, two adults and three young were seen regularly on the Kafue flats at Mazabuka (the eggs perhaps laid in February or March).

Benson and White (1957) provide comprehensive breeding records from Northern Rhodesia—an occupied nest in May, recently fledged juveniles in early June, young just capable of flying in October and laying at Bangweulu in November and December; more recently, Benson, Brooke and Vernon (1964) tabulate the available breeding (egg-laying and young in nest) information—two records in April and one each in May and June.

Most of the Northern Rhodesia records refer to juveniles and the series of observations by Benson and Pitman (1958) suggest egg-laying may take place from the latter part of March till June; references to juveniles under parental care include—two juveniles (once), three (thrice) and four young (twice). Later, Peter Steyn (1963) when in the Kafue National Park at the end of August, 1962, saw one large nestling, perhaps two, in a nest “on

top of a pillar-like growth of thick creepers and bush growing on an ant hill, and also "a pair of saddle-bill storks with two young recently out of the nest".

On 17th May, 1959, near Kariba lake, in a locality soon to be inundated, B. Hellam (1960) found c/3 Saddle-bill, in a very advanced state of incubation, in a nest at the top of an acacia tree. The eggs, measuring 84.3 x 60.0, 81.2 x 61.0 and 83.2 x 61.0 mm., have rather heavy shells and are white (one slightly nest-stained) with a fine matt surface (or texture), so typical of storks' eggs, and rather glossy—more so than usual.

In addition, Benson (*in litt.*) has most generously made available for my purpose the unpublished records of twenty-five broods—which with others are critically examined later—from observations made, principally in the Kafue National Park, during the period July 1958 to October 1964, as well as providing references to a nest containing two eggs which was viewed from the air and another which was inaccessible in which a bird was brooding.

SOUTHERN RHODESIA (now RHODESIA). Priest (1942) in mid-September, observed two young Saddle-bills, together with an older juvenile, all three were later fed by the parents; and Smithers, Irwin and Paterson (1957), for the same territory, record breeding in February; more recently, Benson, Brooke and Vernon (1964) tabulate three breeding records for February and four for March. In the Southern Rhodesia waters of Kariba Lake, according to H. Miles (*in litt.*) (and a Southern Rhodesia Nest Record Card), c/4 downy young were rescued on 6th April, 1959 from a Saddle-bill nest threatened by the rising waters and successfully reared; nearly six weeks later, on 20th May, they were still unable to fly.

Valuable data are also available from nine other Southern Rhodesia Nest Record Cards which indicate nesting from 10th February to 14th July. There are three February records—c/3 on 10th February; c/4 on 23rd February; and birds incubating on 25th February, but it was not possible till 7th March to ascertain that this nest contained four eggs, on 5th April (4?) very small chicks were in the nest, and on 21st May the young (4?) had left. One March record—c/3 on 9th March, which later hatched into three chicks. One April record—c/3 and one nestling on 5th April; these had been reduced by 15th April to three nestlings and by 21st May there were only two, which were ringed; one was found dead on 1st August some time after they had left the nest. Two May records—three juveniles in a nest on 2nd May, and four juveniles on a nest on 15th and 16th May. Two July records—three two-thirds grown juveniles still in the nest on 13th July and two fledglings accompanied by both parents on 14th July.

SOUTH AFRICA. According to Roberts Revised (1957), in February, the Saddle-bill breeds in the Northern Transvaal, on the larger rivers, mostly on high trees on the river bank, laying three dull white eggs, slightly glossy and coarse in texture—measuring 78.5 x 56.2, 77.3 x 56.0 and 76.1 x 56.2 mm. *Vide* Clancey (1964) "in the Transvaal is recorded as breeding in June". Two adults and a juvenile on a nest on 3rd July 1956 are data taken from a South Africa Nest Record Card.

BROOD SIZE and SURVIVAL RATE. Clutch size north of the Equator seems usually to be limited to three eggs from which often only two juveniles survive; in Northern and Southern Rhodesia a set of four is frequent and three juveniles with or without parental care are unlikely always to represent 100 per cent survival for sometimes they may indicate a loss of one out of c/4.

Judging from the size of broods as observed under parental care, the survival rate of broods prior to fending for themselves appears to be encouraging.

There are many more records of nestlings or of fledglings, alone or with one or both parents, than there are of eggs. Juveniles, once out of the nest are easy to see, whereas the brooding bird on a well-concealed nest, more often than not inaccessible at the top of a lofty tree, cannot be seen from the ground and a nest is not easily detected as the bird sits very tight. Attwell (Game Department Report), however, has pointed out that the parent has the "usual dirty habits of storks" and the ground below a nest, and the nest itself can be spattered with droppings, which could draw attention to a nest.

I have been able to examine a total of fifty breeding records—eggs, nestlings and fledglings—from Tanganyika (two), Northern Rhodesia (37) and Southern Rhodesia (ten) and South Africa (one). Twenty-six of the Northern Rhodesia records are from the Kafue National Park and another four from the neighbouring Kafue region; from Southern Rhodesia six are from the Wankie Game Reserve and three from Kariba lake.

Three of these 50 records refer to eggs, one set of four and two sets of three each; of the remainder, 42 are broods, mostly after they have left the nest—either with or without parents—and include c/3, all the eggs hatching; and five broods are indeterminate—c/4, the number hatched and which left the nest uncertain, but probably four; c/3 and one nestling, which ten days later were reduced to three nestlings, and five weeks later to only two; c/2 observed from the air (which may have been an incomplete set); an occupied, inaccessible nest, its contents not known; and a nest containing one or two large nestlings.

Young birds which have left the nest are referred to as fledglings or juveniles and the broods under reference were either accompanied by one or both parents, or unaccompanied.

Table of brood sizes

	<i>Accompanied by one or both parents or in the nest</i>					<i>Unaccompanied</i>				<i>Total</i>
Brood size	4	3	2	1		5	4	3	2	1
Number of broods	(b) 5	(c) 10	8	(d) 7		(a) 1	2	4	4	1
										42

(a) So large a brood as five is abnormal, but a reliable observer saw five fledglings together, not yet strong on the wing and unaccompanied by parents. In the absence of any conclusive data comment on this outsize brood would be superfluous, though the reference by Priest (1942) to two young Saddle-bills together with an older juvenile, does suggest the possibility of broods joining up.

(b) Includes three broods still in the nest.

(c) Includes four broods in the nest.

(d) Includes three nests each containing a single nestling. Commenting

on the tabulated figures, sets of eggs or broods of four are frequent. Three eggs may constitute the normal clutch size, though two c/3 and 14 records of three-size broods (four of which were unaccompanied by parents) out of a total of 42, are inconclusive. As previously mentioned, two juveniles—which may be the survivors from c/3 or c/4—seem to indicate an almost certain measure of egg wastage or juvenile mortality; of the 12 records tabled, four are of unaccompanied broods. The extent of possible juvenile mortality (or egg wastage) is further emphasised by the eight single juveniles (one unaccompanied) listed.

Juvenile mortality (or egg wastage) evidently can be considerable, though not disastrous, and seems to have occurred in about 48% of the 42 broods under discussion and the overall loss may amount to about 30%, which is not excessive.

Some interesting facts emerge from these brood data; one unaccompanied brood of three was estimated to have left the nest only one week previously—so why were they alone? Similarly, two unaccompanied fledglings had recently left the nest; another two, also unaccompanied, could only fly a few yards at a time; and two very young ones observed on 18th November constitute an unusually late record—perhaps a July or August laying?

Some of the 'single' observations merit special attention: a fledgling, with its parents, had obviously just left the nest—when and how did the loss of the other members of the brood occur?; there are two instances of one down chick (one about three weeks old) and also of one juvenile in a nest—to what was the possible mortality per nest attributable?; and, what would account for an 'unaccompanied' juvenile not more than ten days out of the nest?

INCUBATION, NESTLING and FLEDGLING PERIODS. In this context the fledgling period refers to the time after the young birds have left the nest until the brood eventually separates.

On the assumption that the incubation and nestling periods of the Saddle-bill are likely to differ little from those of the White Stork and following Bannerman (1957), the period of incubation of the former is probably about four weeks and that of the nestling a further eight to nine weeks. But as the Saddle-bill eggs average (82.5 x 58.5 mm.) a good deal larger than those of the White Stork (73.2 x 51.81 mm.) it is possible that the incubation period may be longer. It is not known whether the eggs are laid every other day; in the sultry conditions of Africa incubation probably commences as soon as the first egg is laid.

E. Davison, the Warden of the Wankie Game Reserve in Southern Rhodesia has a record of Saddle-bills incubating on 25th February; four eggs were counted in this nest on 3rd March and very small nestlings were seen in it on 5th April. This suggests an incubation period of about five weeks. These young left the nest on 21st May, approximately seven weeks after hatching. According to Davison an observer estimates the incubation period of the Saddle-bill to be 42–48 days and the nestling period 46–48 days, these combined periods thus varying from about 12½ weeks to about 14 weeks, which differ little from the similar combined periods—12 to 13 weeks—of the White Stork. But I consider that this estimate of the incubation period is too long and that of the nestling period possibly too

short. For instance, four downy young found on 6th April which still could not fly on 20th May would probably have been nestlings for at least seven weeks, as also would have been young which started hatching on 5th April and were still in the nest on 21st May. There is also the record of downy young—their age not stated—which six weeks later were still unable to fly, but these had been reared in captivity.

The down chick of the Saddle-bill is described as white, woolly or fluffy, with a blackish or horn-coloured bill. At three weeks old it is still in this plumage and the bill is only $3\frac{1}{2}$ inches long. It is not clear at what size, in relation to that of the adults, the nestlings leave the nest, but when half-grown they are still in the nest; and from Southern Rhodesia there is a reference to nestlings "two-thirds grown". When they leave the nest, and for a few weeks after, the head and neck remain white and woolly and the bill blackish. A half-grown fledgling observed on a nest on 29th August was seen to be under parental care in the vicinity of the nest on 15th September; a parent sitting on 3rd April (on what?) was seen to have four half-grown nestlings on 4th May.

Benson and Pitman (1958) refer to fledged young in various stages of growth in which the young did not show "any red on the bill or legs, which were wholly black, while the areas which are black in adults were mainly dark grey, and those which are white were pale grey." At what age or stage the individuals of a brood separate has not been recorded, but they are still together when the red colour is appearing on the bill and when the yellow 'saddle' begins to show. It is not known at what age these changes take place. It is evident from Turner's observation that the young Saddle-bill is able to fend for itself immediately after it has left the nest, which is supported by a Northern Rhodesia record of a juvenile on its own "not more than ten days out of the nest".

Other observations such as "obviously just left nest", "only recently left nest", "believes left nest one week ago" and "not out of nest more than ten days ago" are presumably based on the limitations of the young birds' powers of flight, as have been referred to by Turner. However, according to Benson (*in litt.*) J. M. C. Uys does qualify a record of an unaccompanied "very young juvenile not out of nest more than ten days" by basing his calculation on "the state of the wings and it was covered with a blackish down unlike an adult bird" (Benson suggests the "blackish down" refers to feathers).

NEST CONSTRUCTION, SIZE and SITE. The data available indicate that the nest is usually, if not invariably at the top of a tree varying from about 80 feet in height to as low as 15 feet; I have already made various references to site, construction and size, as well as to the use of the same nest year after year. Davison refers to a nest used annually in the Wankie Game Reserve, and in which the birds begin to show interest in the middle of January. Another nest in the same Game Reserve which has been used for three years is described as "a flat platform of sticks lined with grass" and the eggs "glossy white, with a blue tinge, slightly pitted"; after it had been vacated by the Saddle-bills one year, it was used by a pair of Secretary Birds.

According to Praed and Grant (1952) "may possibly nest on cliffs", and again Praed and Grant (1962) "occasionally on cliffs"; also Clancey

(1964) "sometimes on the ledge of a cliff" (this is based on the two preceding); but I have been unable to obtain any evidence to support cliff breeding.

Nest dimensions I have been given vary from 9 feet by 6 feet, an immensely massive structure or about 5 feet diameter and 18 to 24 inches thick or somewhat oblong and 4-5 feet by 3 feet to about $3\frac{1}{2}$ feet or 3 feet in diameter.

Nests are usually constructed of large sticks, and lined with smaller ones, some grass and occasionally a few feathers (these possibly off the parents); a nest "made entirely of grass" was "almost flat" and "at the top of a 15 foot high tree, *Albizzia harveyi* laced with a thorny vine, on an ant-hill on a grassy plain".

Low-sited nests seem to be not infrequent as there are also records of one at the top of a low thorn tree and another on top of a *Capparis* covered *Diospyros mespiliformis* 15 feet high; Peter Steyn's record of a nest "on a pillar-like growth of thick creepers" also refers to a low site.

Nest sites vary considerably as instanced by one 60-70 feet up in a flooded baobab at Kariba lake (as a rule nests are not in trees standing in water); another at the top of a straight-boled tree (*Manilkara mochisa*) about 50 feet high and two others at 50 feet; two at 40 feet—one on the crown of a large lone tree well out in a vlei, the other on top of a large *Acacia* in open mixed woodland; one in the old nest of an eagle, *Aquila wahlbergi* Sundevall at 30 feet on an *Acacia giraffae*; two on baobabs—one at 22 feet above the flood water of Kariba; another 30 feet up in the crown of an isolated *Kigelia pinnata* on an ant-hill in the centre of a *dambo* (or vlei)—the nearest tree was a quarter of a mile distant at the edge of *Brachystegia* woodland; another on top of a large tree in an extensive pan with water, but the tree not in the water; and one which was inaccessible at the top of an *Euphorbia ingens*. A tall bird like the Saddle-bill, and its young, require plenty of vertical space—such as one finds on top of a tree—to enable them to stand on the nest.

EGG MEASUREMENTS. The measurements of the twelve eggs which have passed through my hands vary from 79.0-86.3 x 55.3-62.0 mm.; their average is approximately 82.5 x 58.5 mm.

BEHAVIOUR. According to Turner, the adult birds—although not shy on the ground—when on the nest are extremely nervous and sensitive to disturbance, as is occasioned by the noise of a car, which resulted in their not showing themselves at all. It is probable that frequent overlooking and the photographing of the nest by the Kazinga Channel, in Uganda, were responsible for the parents' desertion of eggs on the point of hatching—an unusual happening at such an advanced stage of incubation. But it tends to bear out Turner's claim of the extreme nervousness of this species when on the nest. According to Bannerman (1957) the Black Stork, *Ciconia nigra* (Linn.) too is very easily inclined to desert.

Several reliable observations indicate how tight a brooding bird will sit, but on the other hand there are equally reliable records which suggest that a brooding bird may not always be so careful in diverting attention from a nest.

Turner has never heard the Saddle-bill make any noise or call and there is no mention of any call by adults or young in the unpublished records I have seen.

In the Southern Sudan, when the c/3 fresh eggs were being plundered, the two parents demonstrated vigorously against the intruder.

C. J. P. Ionides (*in litt.*) tells me he once watched a Saddle-bill on the seashore, in Tanganyika, "herding fish into the shallows, using wide open wings to drive them into shallow water and then catching them".

FOOD. In the numerous unpublished records which I have been permitted to study there are no references to the type of food taken to the nestlings or the frequency of feeding. According to Bannerman (1957) quoting Bouet, in the case of the White Stork the young when five days old are fed every hour and when fifteen days old every two hours; similar observations on the feeding frequency of the Saddle-bill are needed. Juveniles clap their bills on the arrival of a parent with food.

BREEDING SEASONS. The known or presumed breeding seasons (eggs or nestling) of *Ephippiorhynchus senegalensis* are:—

WEST AFRICA	January (and presumably next two or three months).
CONGO	No data.
SOUTHERN SUDAN	September to April.
NORTHERN UGANDA (NILE REGION)	November (or October) to February (or March).
WESTERN UGANDA (near LAKE EDWARD)	May–June–July.
KENYA (AMBOSELI)	Probably May–July.
TANGANYIKA—now TANZANIA (WESTERN SERENGETI)	Perhaps April–May–June.
NYASALAND—now MALAWI, and adjacent MOÇAMBIQUE	Perhaps January; also, according to Praed and Grant (1952) "probably August."
NORTHERN RHODESIA—now ZAMBIA	April to August; November and Dec- ember.
SOUTHERN RHODESIA—now RHODESIA	February–July.
SOUTH AFRICA (NORTHERN TRANSVAAL)	February–July.
ANGOLA	No data.

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SUMMARY

1. The unreliability of some of the original Saddle-bill egg data, faithfully copied for many years, is indicated.
2. Published for the first time are many nesting and brood records from the Southern Sudan, Uganda, Tanganyika, Northern Rhodesia, Southern Rhodesia, South Africa and Nyasaland.
3. An outline is given of the breeding season in various parts of Africa.
4. The eggs are described and there is reference to clutch size and survival rate.
5. The incubation and nestling periods are discussed, as well as growth stages after leaving the nest.
6. There are details of nest size, construction and site.
7. There is a brief reference to behaviour.

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